

NASA SBIR/STTR Technologies
Proposal No. S1.09-9258



Title of Proposal: Planetary-WhiGS: An Optical MEMS-Based Seismometer

PI: Dominique Fourquette, Ph.D.

Michigan Aerospace Corporation, Ann Arbor, MI

Identification and Significance of Innovation

Optical whispering gallery modes provide significant advantages to other sensing approaches:

- High quality factor: Q was demonstrated up to 10^8
- Finesse larger than interferometry by more than 2 orders of magnitude.
- Sheltered electronics remote from the optical MEMS assembly
- Immune to EMI
- Sensitivity independent of proof mass velocity (unlike inductive sensing).

*Expected TRL Range at the end of Contract : 3

Technical Objectives:

- Microsphere material and size selection
- Environmental considerations for the design
- Instrument design

Work Plan:

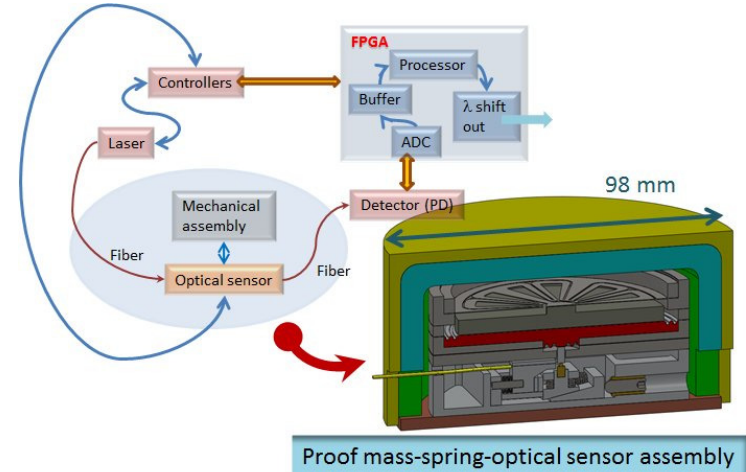
Task 1: Requirements definition;

Task 2: Microsphere selection and design;

Task 3: Environmental effects;

Task 4: Seismometer design.

All tasks have been completed.



NASA Applications:

Moon and planetary exploration, planetary sciences, satellite drag measurements

Non NASA Applications

- Geological research: mining and oil prospecting
- Earth sciences
- Space exploration: satellite drag measurements, docking, navigation
- Homeland security: footstep, tampering, entry and illicit activity detection

Firm Contact

Dr. Dominique Fourquette, Vice President for Research & Development
Michigan Aerospace Corporation 1777 Highland Drive, Suite B
Ann Arbor, MI 48108-2285; (734) 975-8777 x114

dfourquette@michiganaerospace.com

NON-PROPRIETARY DATA